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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WILLS, MONIQUE M	

ART UNIT	PAPER NUMBER
1746	11

DATE MAILED: 03/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Applicati n N .	Applicant(s)	
	09/851,479	WENSLEY, C. GLEN	
	Examiner	Art Unit	
	Wills M Monique	1746	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondence address --

Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Pri rity under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action is responsive to the Amendment filed October 1, 2003. The rejection of claims 1-20 under 35 U.lS.C. 103(a) as being unpatentable over Plastic Li-ion (PLION™) Rechargeable Cells with Bonded Microporous Separatr by Antoni S. Gozdz, in view of Gozdz U.S. Patent 6,579,643 and further in view of Gozdz et al. U.S. Patent 5,418,091 is overcome. Claims 1-20 are newly rejected as follows:

- Claims 1-3,10,11,13,1 & 17-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Pekala et al., U.S. Patent 6,586,138.
- Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al., U.S. Patent 6,586,138 as applied to claim1 above.
- Claims 4,5 ,7 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al., U.S. Patent 6,586,138 in view of Gozdz et al., U.S. Patent 5,418,091.
- Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al., U.S. Patent 6,586,138 in view of Kurauchi et al., U.S. Patent 5,691,047.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3,10,11,13,1 & 17-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Pekala et al., U.S. Patent 6,586,138.

With respect to claim 1, Pekala teaches a separator comprising a membrane having a first surface, a second surface, and a plurality of micropores extending from the first surface to the second surface (See Fig. 4b); a coating (116) covering the membrane, but not filling the plurality of micropores (Fig. 4b & col. 5, lines 50-60), the coating comprising a gel-forming polymer and a plasticizer (col. 5, lines 17-41) and has a surface density of 0.6, 0.71, or 0.83 mg/cm^2 (See Table 1). With respect to claim 2, the coating (116) covers the first surface and the second surface (see Fig. 4b). With respect to claim 3, the gel-forming polymer is a copolymer of polyvinylidene fluoride (col. 5, line 28). With respect to claim 10, the coating has a surface density of 0.55 to 0.7 mg/cm^2 (Table 1). With respect to claims 11 & 13, the plasticizer is propylene carbonate (col. 5, lines 40-42). With respect to claim 14, the membrane is a single layer microporous membrane (Fig. 4b). With respect to claim 17, the membrane is a

shutdown membrane (col. 1, lines 55-65). With respect to claim 18, the membrane contains an ultra high molecular weight polyethylene (col. 5, lines 62-68). With respect to claim 19, the method of making a separator comprises: providing a microporous membrane having a plurality of micropores; providing a solution, the solution comprising a gel-forming polymer (EAA; 20g), a plasticizer (isopropanol; 10g), and a solvent (water;10g), providing a solution concentration being of 50wt %; coating the solution onto the membrane; driving off the solvent of the solution; and forming thereby a coating covering the memebrane, but not filling the plurality of micropores. See Example 3. With respect to claim 20, the solution concentration is 4% by weight (Table II). The limitations are anticipated by the prior art set forth. The limitation in claim 1, with respect to the plasticizer and gel-forming polymer being in a weight ratio of 1:0.5 to 1:3, is considered to be an inherent property of the coating mixture as set forth in the prior art, because Pekala employs 20 g of an EAA gel-forming polymer and 10g of isopropanol plasticizer providing a weight ratio of 1:0.5. With respect to isopropanol as a plasticizer, a plasticizer refers to an organic solvent , with limted solubility of polymers, that facilitates the formation of porous polymer structures (See Menon U.S. Patent 5,894,656 at column 4, lines 59-64). Therefore, isopropanol functions as a plasticizer by facilitating the formation of pores in the polymeric structure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al., U.S. Patent 6,586,138 as applied to claim1 above.

Pekala teaches a separator comprising a gel coating as described hereinabove, including a gel-forming polymer and plasticizer in a weight ratio of 1:0.5.

The reference is silent to a separator where the ratio is 1:2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a gel-forming polymer and plasticizer ratio of 1:2, since it has been held that discovering optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the amount of plasticizer directly effect porosity of the membrane.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4,5 ,7 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al., U.S. Patent 6,586,138 as applied to claim 1 above, and further in view of Gozdz et al., U.S. Patent 5,418,091.

Pekala teaches a separator comprising a gel coating as described hereinabove, including a gel-forming polymer of vinylidene fluoride-hexafluoropropylene copolymers (col. 5, lines 25-30). Pekala also teaches a propylene carbonate plasticizer (col. 5, lines 40-43).

The reference is silent: to hexafluoropropylene comprising 3 to 20% by weight of the copolymer (claims 4, 5 & 7) and a dibutyl phthalate plasticizer (claim 12).

Gozdz teaches that it is conventional to employ polymeric electrolyte films comprising copolymers of vinylidene fluoride with 8 to 25 % hexafluoropropylene, to limit crystallinity of the final copolymer to a degree that ensures good film strength while enabling the retention of about 40 to 60% of electrolyte solvent. The reference also teaches the equivalence of dibutyl phthalate and propylene carbonate as plasticizing solvents for making polymer electrolytes.

The invention as a whole would have been obvious to one have ordinary skill in the art at the time the instant invention was made, because even though Pekala does not teach a vinylidene fluoride-hexafluoropropylene copolymer comprising 3 to 20% by hexafluoropropylene, Gozdz teaches that said weight percent ensures good film strength while enabling the retention of about 40 to 60% of electrolyte solvent.

With respect to claim 12, Gozdz teaches the equivalence of dibutyl phthalate and propylene carbonate as plasticizing solvents for making polymer electrolytes. Therefore, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the instant invention was made because even though Pekala does not teach dibutyl phthalate plasticizers, Gozdz teaches that dibutyl phthalate and propylene carbonate are art recognized equivalent materials for plasticizing electrolyte polymers, and therefore, one having ordinary skill in the art would have substituted one plasticizer for the other.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al., U.S. Patent 6,586,138 as applied to claim1 above, and further in view of Kurauchi et al., U.S. Patent 5,691,047.

Pekala teaches a separator comprising a gel coating as described hereinabove.

The reference is silent to a trilayer membrane having a polypropylene/polyethylene/polypropylene structure.

Kurauchi teaches that it is conventional to employ porous multi-layer membranes of polypropylene/polyethylene/polypropylene structure to provide high thermal durability, keep the shutdown conditions for a wide temperature range and increase elastic recovery (col. 4, lines 1-7).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the instant invention was made because even though Pekala does not teaches a membrane having a polypropylene/polyethylene/polypropylene structure, Kurauchi teaches that said structure provides high thermal durability, keeps the shutdown conditions for a wide temperature range and increases elastic recovery.

Response to Arguments

Applicant asserts that gel-coating of the Gozdz publication does not suggest a surface density of 0.4 to 0.9 mg/cm^2, even though the coating materials are similar to the subject invention. Applicant provides Spotnitz et al., U.S. Patent 6,322,923 as evidence that similar materials do not have a surface density of 0.4 to 0.9 mg/cm^2. Specifically, Spotnitz teaches a gel coating made of the instant materials, but has a surface density of less than 0.3 mg/cm^2. Therefore, Gozdz does not suggest the

claimed surface density even though the materials are similar, and the rejection is overcome.

Conclusions

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Randy Gulakowski, may be reached at 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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